

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 04/01/77		3. REPORT TYPE AND DATES COVERED	
4. TITLE AND SUBTITLE ROCKY MOUNTAIN ARSENAL INSTALLATION RESTORATION PROGRAM, PILOT CONTAINMENT RECHARGE SYSTEM, TEST PLAN				5. FUNDING NUMBERS	
6. AUTHOR(S) GLASSMAN, I.					
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) ROCKY MOUNTAIN ARSENAL (CO.) COMMERCE CITY, CO				8. PERFORMING ORGANIZATION REPORT NUMBER 85154R14	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES					
12a. DISTRIBUTION/AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED				12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) THE OBJECTIVES OF THE PROPOSED TEST ARE TO PROVIDE PRELIMINARY DATA FOR THE DESIGN-CONSTRUCTION OF RECHARGE PITS ALONG THE NORTH BOUNDARY CONTAINMENT LINE (BENTONITE BARRIER). THIS EVALUATION WILL GUIDE IN DETERMINING THE SIZE, SPACING, FLOW RATE, AND NUMBER OF RECHARGE PITS NEEDED SO AS TO APPROXIMATE AS CLOSELY AS POSSIBLE EXITING GROUND WATER FLOW CONDITIONS PRIOR TO INSTALLATION AND OPERATION OF THE PILOT CONTAINMENT SYSTEM.					
14. SUBJECT TERMS SLUG TEST				15. NUMBER OF PAGES	
				16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT		

85154R14
ORIGINAL

ROCKY MOUNTAIN ARSENAL

INSTALLATION RESTORATION PROGRAM

PILOT CONTAINMENT -- RECHARGE SYSTEM

TEST PLAN

1 APR 77

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

Irwin M. Glassman
IRWIN M. GLASSMAN
Director of IR

Rocky Mountain Arsenal
Information Center
Commerce City, Colorado

19950227 040

FILE COPY

ROCKY MOUNTAIN ARSENAL
RECHARGE SYSTEM TEST PLAN

1 APR 77

1. Objectives - The objectives of the proposed test are to provide preliminary data for the design-construction of recharge pits along the north boundary containment line (bentonite barrier). This evaluation will guide in determining the size, spacing, flow rate, and number of recharge pits needed so as to approximate as closely as possible existing groundwater flow conditions prior to installation and operation of the pilot containment system.

2. Location - The recharge evaluation test will take place along the line proposed for the recharge system under actual operating conditions (which is 250 feet north of the bentonite barrier). Three sites along that line will be evaluated. Site A will be positioned 250 feet east of the west end of the proposed barrier. Site B will be 400 feet west of the east end, and Site C will be 100 feet west of B. Site A is located in the area in which the sand and gravel aquifer is relatively thin -- less than four feet thick. Sites B and C are located in an area in which this sand and gravel aquifer reaches its maximum thickness, varying between approximately 10 and 18 feet.

3. Field Design

a. These recharge shafts will consist of 36-inch diameter bore holes drilled approximately two feet into the aquifer material. The bore holes will be cased, utilizing corrugated steel pipe in a manner consistent with drilling practices normally used in industry in which cased bore holes are required. The casing will be driven to the bottom of the shaft, and the hole will be inspected and cleaned out to ensure that no nonaquifer material remains inside the casing. Gravel material, one-half or three-fourth inch size, will be placed at the bottom of this shaft to cover the bottom to a depth of three feet. The casing will then be backed off the bottom to a height equivalent to the top of the sand and gravel aquifer.

b. In addition to the recharge shafts, two observation wells will be installed on the down-gradient side at each shaft. The spacing of these wells will be 5 feet and 25 feet from the recharge points.

RMA, RECHARGE SYSTEM TEST PLAN -- Cont

4. Test Phase - The recharge test will consist of two phases: (1) A slug test and (2) A dynamic test. The source of water for both of these wells will be water from the bog.

a. Slug Test - The slug test consists primarily of filling the recharge pit with water and measuring the rate of all of the hydraulic head. This will provide data on the volume of water uptake per square foot of aquifer per unit time and will be used to determine the range of constant-Q tests to be performed in phase 2. The observation wells on the down-gradient side will be monitored during this first phase. The monitoring schedule will be at 1 minute intervals for the first 10 minutes, 10 minute intervals between 10 and 100 minutes, and 100 minute intervals for any determinations after 100 minutes. Measurements will be made on this schedule until no changes are detected in water levels in the observation wells for 3 consecutive time intervals beyond the 100 minute threshold. Approximately 600 gallons will be required for each bore during the slug test.

b. Dynamic Test

(1) Based on the results of the slug test described above, a constant-Q test will be performed at each of the three sites. It is anticipated that three constant-Q tests will be performed at each site. The anticipated discharge rates will be 10, 20, and 40 gpm. The recharge will be maintained at these constant discharge rates until a constant head conditions results, and that constant head will be maintained for at least eight hours.

(2) The observation wells will be monitored according to the scheduled intervals described in the slug test to the end of the eight hour constant head time interval.